REMARKS/ARGUMENTS

Currently amended Claims 1 and 12; previously presented Claims 2-6, 8-11, 13-24, and 27-28; and new Claims 29-30 are pending in the application. Claim 7 has been canceled.

Support for the polymethyl methacrylate (hereafter PMMA) layer "having a thickness in the range from 2 to 5 mm" in currently amended Claim 1 is found in the Specification at page 17, lines 25-28. Support for the PMMA layer having "a average surface roughness R_z in the range from 5 to 50 μm" in currently amended Claim 1 is found in the Specification at page 20, lines 16-20. Support for "wherein the median particle size V_{50} of the spherical particle (B) is greater by at least 5 μm than the median particle size V_{50} of the scattering particles (A)" in currently amended Claim 1 is found in the Specification at page 11, lines 19-23 and previously presented Claim 12. Support for currently amended Claim 12, is found in the Specification at page 11, lines 19-23. Support for new Claims 29 and 30 is found in the Specification at page 20, lines 16-20.

No new matter has been added.

Rejection of Claims 1-3, 8, 10-15, 20, 23, and 28 under Section 103 over Ludwig and Kimura

Previously presented Claims 1-3, 8, 10-15, 20, 23, and 28 were rejected under 35 U.S.C. 103(a) as unpatentable over Ludwig (EP0561551 A1, published September 22, 1993) in view of Kimura (Kimura et al., U.S. 6,602,596 B2, issued August 5, 2003). See the Office Action, dated October 17, 2008 (OA), page 4.

Ludwig describes bilayer rear projection screens comprising a first layer adhered to a second polymeric layer containing light diffusing particles (Ludwig, p. 2, ll. 1-2; p. 2. l. 32-33; p. 3, ll. 7-13). Both layers may have PMMA polymeric matrices (Ludwig, p;. 2, ll. 36-45). The thickness of the first layer is 3 to 12 mm, preferably 5 to 7 mm (Ludwig, p. 3, l. 14). The thickness of the second layer is 0.25 to 1.25 mm, preferably 0.4 to 0.8 mm (Ludwig, p. 3, ll. 14-16). The light diffusing particles in the thinner second layer are spherical and said to

have a diameter from 2 to 15 μm and a size distribution such that 90% of the particles are within ± 20% of the average particle diameter (Ludwig, p. 2, ll. 32-35; p. 3, ll. 39-54). However, Ludwig more generally teaches (Ludwig, p. 3, ll. 28-31):

> The light diffusing agent particles used are in general substantially spherical in shape and their average particle size ranges from 0.1 to 500 microns. . . . Moreover, the particles preferably have a particle size distribution in which the particle size of at least 90% by weight of the particles falls within the range of the average particle size of ± 20%. . . . .

Ludwig's particles are incorporated into the matrix of the second polymer layer in an amount ranging from 1 to 40% by weight (Ludwig, p. 3, ll. 36-37). The particle size of the particles employed in the 0.5 mm thick second layer (Ludwig, p. 4, l.4) of each of Ludwig's examples are reported to be 0.3 μm (Ludwig, p. 4, l. 55, Step A), 2 μm (Ludwig, p. 5, l. 35, Step B), and 5 μm (Ludwig, p. 5, l. 42, Step C; p. 6, ll. 35-36, Step D).

Ludwig's invention is directed to bilayer sheets (Ludwig, p. 2, ll. 32-35). Ludwig not only expressly teaches away from single layer sheets but instructs that the art is surprisingly unpredictable (Ludwig, p. 2, ll. 24-31; emphasis added):

> A single-layer sheet of about 5 mm. thickness containing an appropriate amount of the light-scattering particles defined herein will exhibit good diffusion of light at wide angles, but will suffer somewhat in poor image resolution. Calculations based on the light-scattering behavior of small particles <u>would have predicted that a bilayer structure wherein the particles were concentrated in the second thinner layer would have given diffusion equivalent to the optical behavior expected in a single matrix sheet with a distribution of a similar weight of particles and of equivalent overall thickness. Surprisingly, the bilayer sheet of the present invention offers advantages in resolution of images over the single-layer construction</u>, and advantages in cost savings, ease of preparation and scratch resistance over conventional screens.

The PTO directs Applicant's attention to Ludwig's disclosure at page 3, line 37 (OA, pp. 4-5), for teaching of 0.5 to 59.5 wt% of spherical scattering particles (A) having a median size in the range of 0.1 to 40 μm and 0.5 to 59.5 wt% spherical particles (B) having a median size in the range of 10 to 150 μm in accordance with Applicant's claimed invention. However, Ludwig there merely teaches persons having ordinary skill in the art to include 0.1 to 40 wt% of its light diffusing particles in the matrix forming its second polymeric layer.

Moreover, Ludwig prefers to employ light diffusing particles having a diameter from 2 to 15 μm (± 20%) and its examples employ light diffusing particles having a diameter from 0.3 to 5 μm. Because the median size of the spherical scattering particles (A) having a median size in the range of 0.1 to 40 μm and the median size of the spherical particles (B) having a median size in the range of 10 to 150 μm must differ by at least 5 μm in a single PMMA layer having a thickness of 2 to 5 mm which comprises Applicant's claimed diffuser sheet, persons having ordinary skill in the art reasonably would not have been led by Ludwig's teaching relating to bilayer diffuser sheets comprising a 0.25 to 1.25 mm, preferably 0.4 to 0.8 mm, PMMA diffusing layer with light diffusing particles having a diameter from 2 to 15 μm (± 20%), preferably having a diameter from 0.3 to 5 μm, to make and use a single-layer PMMA diffuser sheet having a thickness of 2 to 5 mm comprising PMMA and spherical scattering particles (A) having a median size in the range of 0.1 to 40 μm and the median size of the spherical particles (B) having a median size in the range of 10 to 150 μm where the median size of the spherical particles (B) in the single PMMA layer is at least 5 μm greater than the median size of the spherical scattering particles (A). The particle size differential is significant because the average surface roughness R_z of Applicant's PMMA layer must be 5 to 50 μm.

Summarizing, Ludwig teaching is directed to a bilayer diffuser sheet. Applicant claims a single layer diffuser sheet. Ludwig's PMMA diffuser layer with diffuser particles is much thinner than Applicant's PMMA diffuser layer with spherical scattering particles. Even if one assumes that the diffuser particles in Ludwig's diffuser layer correspond to Applicant's spherical scattering particles (A), Ludwig's diffuser layer does not include the significantly larger spherical particles (B) in an amount greater than the amount of spherical scattering particles (A) required in Applicant's diffuser layer.

The deficiencies in Ludwig's teaching are many. However, Ludwig also suggests that results achieved using the parameters and considering the variables pertinent to single-layer diffuser sheets do not correlate to results achievable using parameters and and considering the variables pertinent to bilayer diffuser sheets and vice versa. Ludwig would have taught persons having ordinary skill in the art that successful image resolution and scratch resistance using bilayer diffuser sheets cannot be predicted or reasonably expected based on successful image resolution and scratch resistance achieved using single-layer diffuser sheets and vice versa.

In that light, Kimura's invention is directed to a diffuser sheet comprising a single light diffusion layer on a substrate (Kimura, Claim 1). Kimura's diffuser sheet includes a light diffusion layer having a thickness of 25.0-50.0 μm (.025-.05 mm), preferably 30.0-40.0 μm (.03-.04 mm)(Kimura, col. 4, ll. 55-59). The thickness of Kimura's single-layer diffuser is not comparable to the 2 to 5 mm (2000-5000 μm) thickness of Applicant's single diffuser layer. The diffusion particles Kimura employs have a mean particle diameter of 16.0-30.0 μm (Kimura, col. 3, ll. 56-67; Claim 1) with "a coefficient of variation of particle diameter distribution of less than 50.0% . . . [and] 20.0% or more" (Kimura, col. 4, ll. 1-7). According to Kimura (Kimura, col. 3, ll. 2-5), "The uneven surface of the light diffusion layer exhibits an arithmetical mean deviation of 2.0 μm or more and/or a ten point height of irregularities of 10 μm or more in three-dimensional surface roughness measurement." Kimura also states (Kimura, col. 4, ll. 40-54):

> The content of the resin particles cannot be absolutely defined, since it depends on the mean particle diameter of the resin particles and/or the thickness of the light diffusion layer . . . to be used. Generally speaking, however, the content is preferably 180-270 parts by weight, more preferably 200-250 parts by weight, with respect to 100 parts by weight of the binder resin. If the content is less than 180 parts by weight, it is difficult to obtain the arithmetical mean deviation of 2.0 μm or more and/or ten point height of irregularities of 10.0 μm or more when resin particles having smaller mean size. As a result, the light diffusion layer . . . becomes susceptible to damage. If the content exceeds 270 parts by weight, the strength of the

> coated film is lowered and the uneven surface of the light diffusion layer . . . may become susceptible to damage.

There are similarities and significant differences between the kinds and sizes of the polymer diffusion layers and diffusion particles described by Ludwig and Kimura. Applicant shall not only compare the similarities and differences between the teachings of Ludwig and Kimura below, but Applicant also compares the prior art diffusion layers and particles to the PMMA diffusion layer defined by Applicant's claims and the particles employed therein.

First, Ludwig's polymer diffusion layer is 0.25-1.25 mm thick. Kimura's polymer diffusion layer is much thinner at .025-.050 mm (25.0-50.0 μm). On the other hand, Applicant's polymer diffusion layer is thicker than both at 2-5 mm.

Second, Ludwig's polymer diffusion layer contains 0.1-40% by weight of diffusion particles per 100% by weight polymer diffusion layer. Kimura's polymer diffusion layer contains 180-270 parts by weight of diffusion particles per 100 parts by weight of binder resin (~ 64-73% by weight per 100% by weight polymer diffusion layer). Applicant polymer diffusion layer contains 0.5-59.5% by weight of spherical scattering particles (A) and 0.5-59.5% of larger spherical particles (B), with a total concentration of particles (A) and (B) being in the range of 1 to 60% by weight based on the weight of the light-scattering PMMA layer.

Third, Ludwig describes a bilayer diffuser sheet. Kumura describes single-layer diffuser sheet. Applicant claims a single-layer diffuser sheet.

Fourth, Ludwig's polymer diffusion layer contains diffusion particles having an average particle size of 2-15 μm. Kimura's polymer diffusion layer contains diffusion particles having a particle size of 16.0-30.0 μm. Applicant's polymer diffusion layer contains spherical scattering particles (A) having a median size of 0.1-40 μm and spherical particles (B) having a median size of 10-150 μm. Schultes (Schultes et al, US 2002/0123565, published September 5, 2002) teaches (Schultes [0005-0006]), "The smaller the size of the

scattering beads, the greater their scattering effect. . . . [T]he ideal particles have a size in the range from 5 to 20 μm with very narrow size distribution." Applicant's spherical (B) particles have a median size much larger than the optimum scattering size.

Fifth, Ludwig's diffusion particles have an average particle size distribution of ± 20%. Kimura's diffusion particles have a coefficient of variation of particle diameter of 20-50%. Applicant's diffuser layer not only comprises spherical scattering particles (A) having a median size of 0.1-40 μm and spherical particles (B) having a particle size of 10-150 μm but the median particle size V_{50} of the spherical particles (B) must be greater by at least 5 μm, preferably greater by at least 10 μm, than the median particle size V_{50} of the spherical scattering particles (A).

The PTO should understand from the foregoing comparisons that Ludwig and Kimura describe two distinct kinds of diffuser sheets. Ludwig describes a bilayer diffuser sheet while Kimura describes a single-layer diffuser sheet. The thicknesses of the prior art diffuser layers are significantly different. The amounts and mean diameters of the scattering particles used in the prior art diffuser layers are significantly different. Persons having ordinary skill in the art would not find in either prior art reference any suggestion to modify its teaching in light of the other. Moreover, Ludwig teaches that the parameters and results of the single-layer and bilayer prior art diffusion techniques cannot be compared and that successful modifications of one technique cannot be applied to the other with reasonable expectation of success. Moreover, the respective preferences of Ludwig and Kimura lead in opposite directions. Any attempt to modify the teaching of one reference based on the teaching of the other would have been recognized by persons having ordinary skill in the art as contrary to the teaching of one or the other reference. The PTO's attempts to combine Ludwig and Kimura are based in improper hindsight reconstruction of the subject matter Applicant

claims. Kimura's teaching would not have led a person having ordinary skill in the art to modify Ludwig's teaching with any expectation of success and vice versa.

Moreover, even if persons having ordinary skill would have combined the teachings of Ludwig and Kimura, the combination would not have led to the subject matter Applicant claims. The 2-5 mm thickness of Applicant's PMMA layer is significantly thicker than Ludwig's's polymeric diffusion layer and one hundred times thicker than Kimura's polymeric diffusion layer. No combination of the teachings would have led a person having ordinary skill in the art to increase the thickness of the diffusion layer to 2-5 mm.

Persons having ordinary skill in the art would not have found in Ludwig or Kimura incentive, motivation, or reason to add spherical particles having a mean size of 10 to 150 μm to the diffuser layer of either Ludwig or Kimura such that the median particle size of the 10 to 150 μm spherical particles is greater by at least 5 μm than the median particle size of the smaller spherical scattering particles already in the diffuser layer. As indicated above, persons having ordinary skill in the art understood that smaller size beads have a greater scattering effect (Schultes [0005]).

<u>Rejection of Claims 5-7 under Section 103 over Ludwig, Kimura, and Schultes</u>

Previously presented Claims 5-7 were rejected under 35 U.S.C. 103 over Ludwig, Kimura, and Schultes (U.S. Patent Application Publication 2002/0123565, published September 5, 2002)(OA, pp. 10-11). Previously presented Claim 7 limited the thickness of the PMMA layer to the range of 1-10 mm. Currently amended Claim 1 limits the PMMA layer to a thickness of 2 to 5 mm.

The PTO relied upon Schultes' teaching at [0116] to remedy the deficient teachings of Ludwig and Kimura (OA, p. 11). Schultes teaches [0116]:

> The thickness of the molding preferably dependes on the application. For example, the moulding compositions of the invention can be extruded in film. The moulding compositions may also be moulded to give sheets of conventional

> dimensions. Preferred embodiments of the mouldings of the invention have a thickness in the range from 0.05 to 50 mm, preferably from 0.1 to 25 mm . . . .

Based on Schultes teaching, the PTO argues that "it would have been obvious to one of ordinary skill in the art to modify the thickness of the diffuser sheet taught by Ludwig and Kimura with the thickness taught by Schultes because the thickness of the sheet depends on the application for use and the thicknesses of the instant claim are those of conventional dimensions" (OA, p. 11). First, the finding that the thicknesses of currently amended Claim 1 is conventional in the art is clearly erroneous. The thicknesses Ludwig and Kimura require are conventional in the art for their utilities. Ludwig and Kimura require diffuser layers which are far thinner than the range of thicknesses required in Applicant's Claim 1. Moreover, Schultes expressly states that the thickness of the diffuser layer depends on the application. For applications described by Ludwig and Kimura, diffuser layers having thicknesses far less than the 2-5 mm range of Applicant's Claim 1 are conventional and preferred for those application. Nothing in Schultes suggests that thicknesses significantly greater than the thicknesses required by Ludwig and Kimura for their respective applications and uses would serve any purpose whatsoever. To the contrary, persons having ordinary skill in the art would have expected from the teaching of the prior art as a whole that thicker PMMA layers would be unsuitable for the applications and uses to which Ludwig's and Kimura's inventions are put.

The PTO has employed hindsight to find some general teaching of greater diffusion layer thickness in order to reconstruct the subject matter Applicant claims as its invention. Hindsight reconstruction of Applicant's claims is not a proper basis for a holding of unpatentability under 35 U.S.C. 103 for obviousness. The PTO should not maintain the rejection of Applicant's currently amended claims.

Rejection of Claim 4 under Section 103 over Ludwig, Kimura, and Coveleskie

Previously presented Claim 4 stands rejected under 35 U.S.C. 103 over Ludwig in view of Kimura and Coveleskie (U.S. Patent Application Publication 2004/0033427 A1, published February 19, 2004)(OA, p. 9). The rejection should be withdrawn.

Applicant's Claim 4 requires a gloss R85° for the PMMA light-scattering layer of 40 or less. Gloss is the antithesis of light-scattering or light diffusion and entirely inconsistent with Applicant's claimed "average surface roughness R_z in the range from 5 to 50 µm". Applicant teaches (Spec., p. 23, ll. 19-25), "[T]he surface of the inventive diffuser sheets has a matt appearance under reflected light." Coveleskie's image receiving layers have a surface roughness below 1 µ [0084]. Coveleskie teaches away from the diffuser sheets described by Ludwig and Kimura. Coveleskie's general teaching may or may not correlate or reasonably apply to thicker diffuser sheets or diffuser sheets having far greater surface roughness and scattering capability. Inherency requires certainty. The mere possibility that Coveleskie's teaching may equally apply to thicker diffuser sheets or diffuser sheets having far greater surface roughness and scattering capability does not inherently establish that the diffuser layer of Ludwig or Kimura has a gloss R85° of 40 or less.

Rejections of other claims under Section 103

The PTO has variously combined the teachings of Ludwig and Kimura with Ida (U.S. Patent 5,004,785, issued April 2, 1991)(OA, pp. 11-12), Wu (U.S. Patent 5,237,004, issued August 17, 1993) and Plastic Material Data Sheets (OA, pp. 12-13), Groothues (WO/03042290 A1)(OA, p. 13), Yeo (U.S. Patent 6,346,311, issued February 12, 2002)(OA, p. 14), and Nevitt (U.S. Patent 6,268,961, issued July 31, 2001)(OA, pp. 14-15) to establish that the various properties Applicant attributes to the claimed diffuser sheet are inherently

present in the diffuser layers taught by Ludwig and Kimura. The rejections should be withdrawn.

First, Ida, Wu, Plastic Material Data Sheets, Groothues, Yeo, and Nevitt do not remedy the deficiencies of the Ludwig, Kumura, Schultes, and Coveliskie teachings the PTO applied to establish that the diffuser sheet Applicant claims would have been obvious to a person having ordinary skill in the art. The rejections should be withdrawn for that reason alone.

Moreover, the PTO has the initial burden of proof to establish the factual basis for a rejection under 35 U.S.C. 103. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984); *In re Warner*, 379 F.2d 1011, 1016 (CCPA 1967). Where, as here, the PTO summarily combines various prior art teachings without establishing that they are pertinent to the same field of invention or problem and without determining the relevant knowledge and skill in the art to find that Ludwig and Kimura inherently describe and/or reasonably suggest all the limitations of Applicant's dependent claims, the PTO has not satisfied its burden of proof. The citations to other prior art teachings do not per se relieve the Office of its burden of proof. In this case, the PTO has strained to combine the inconsistent teachings of Ludwig and Kimura to suggest the subject matter defined by Applicant's Claim 1. To argue thereafter that other prior art establishes that the inconsistent teachings of Ludwig and Kimura inherently disclose properties and elements with which neither Ludwig nor Kimura is concerned is counter to patent laws which are intended to promote the useful arts.

Rejection of Claims 1-6, 8-15, 20-23, and 27-28 for obviousness-type double patenting

Claims 1-6, 8-15, 20-23, and 27-28 were rejected (1) for obviousness-type double patenting of Claims 1-11 and 14-18 of U.S. Patent 7,064,894, issued June 20, 2006 ('894 patent)(OA, p. 3) and (2) for obviousness-type double patenting of Claims 1-8, 10-15, 17-23, and 25-26 of U.S. Patent 7,339,732, issued March 4, 2008 ('732 patent)(OA, p. 3).

The PTO has not explained why Applicant's currently amended Claim 1 would have been obvious in view of the subject matter claimed in either patent. Without some explanation why the diffuser sheet Applicant claims would have been obvious to a person having ordinary skill in the art over the claims in the patents, Applicant can only speculate as to the basis for the PTO's rejections. Determinations of patentability should never be based on speculation. *In re Steele*, 305 F.2d 859, 862 (CCPA 1962).

The diffuser sheet defined by Applicant's currently amended Claim 1 comprises at least one light-scattering PMMA layer having a thickness in the range of 2 to 5 μm. Claim 7 of the '732 patent, the only claim of the patent which refers to the thickness of the light-scattering PMMA layer, reads, ". . . wherein the thickness of the light-scattering polymethyl methacrylate layer is in the range from 0.05 to 1 mm." The PTO should minimally explain why it would have been obvious to a person having ordinary skill in the art to double the thickness of a PMMA scattering layer in light of the subject matter claimed in the '732 patent.

The light-scattering PMMA layer of the diffuser sheet of Applicant's Claim 1 comprises a polymethyl methacrylate matrix and (1) from 0.5 to 59.5% by weight, based on the weight of the light-scattering polymethyl methacrylate layer, of spherical scattering particles (A) whose median size V_{50} is in the range from 0.1 to 40 μm, and (2) from 0.5 to 59.5% by weight, based on the weight of the light-scattering polymethyl methacrylate layer, of spherical particles (B) whose median size V_{50} is in the range from 10 to 150 μm. Moreover, Claim 1 requires that the median particle size V_{50} of the spherical particles (B) is greater by at least 5 μm than the median particle size V_{50} of the spherical scattering particles (A). The PTO has not shown where or explained how the claims in the '894 patent would have reasonably suggested the combination of spherical scattering particles (A) and spherical

particles (B) with the specific median particle sizes required in a light-scattering PMMA layer of Applicant's claimed diffuser sheet.

In short, the PTO has not satisfied its burden to show that the subject matter Applicant claims would have been obvious to persons having ordinary skill in the art in view of subject matter claimed in either the '894 patent or the '732 patent. Absent some explanation of how and why the subject matter Applicant claims would have been obvious to persons having ordinary skill in the art in view of the claims in either of the patents, the rejections should be withdrawn.

For the reasons stated herein, Applicant's currently amended claims are in condition for allowance. Early notification that this application has been passed to issue is earnestly requested.

Respectfully submitted,

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